Credit Ratings and the Choice of Payment Method in Mergers and Acquisitions

Nikolaos Karampatsas,[a] Dimitris Petmezas [a] and Nickolaos G. Travlos [b*]

[a] Surrey Business School, University of Surrey, Guildford, Surrey, GU2 7XH, UK

[b*] ALBA Graduate Business School at The American College of Greece, Athens, Greece, Tel.: +30 210 8964 531, E-mail: ntravlos@alba.edu.gr (*Corresponding Author*)

February 2014

Abstract

This paper establishes that credit ratings affect the choice of payment method in mergers and acquisitions. We find that bidders holding a high rating level are more likely to use cash financing in a takeover. We attribute this finding to lower financial constraints and enhanced capability of highly rated firms to access public debt markets as implied by their higher credit quality. Our results are economically significant and robust to several firm- and deal-specific characteristics and are not sensitive to the method used to measure the likelihood of the payment choice or after controlling for potential endogeneity bias.

***JEL Classification*:** G14; G24; G32; G34

***Keywords*:** Credit Ratings, Method of Payment, Mergers and Acquisitions

We would like to thank particularly an anonymous referee and also Nihat Aktas, Yakov Amihud, Panagiotis Avramidis, Helen Bollaert, Carlo Chiarella, Jean Gabriel Cousin, Ettore Croci, Eric De Bodt, Andrey Golubov, Michel Levasseur, John Martin, Andrew Mason, Armin Schwienbacher and participants at the 2013 European Financial Management Association (EFMA) Conference as well as seminar participants at the European Centre for Corporate Control Studies-SKEMA Business School and Surrey Business School for helpful comments and suggestions. Travlos acknowledges financial support received from the Kitty Kyriacopoulos Chair in Finance. All remaining errors are our own.

1. Introduction

Credit Rating Agencies (CRAs) play an important role in the finance world by assessing the creditworthiness of a particular firm, security or obligation (Securities and Exchange Commision (2003)) and assigning a rating. CRAs disclose and disseminate this information to the market (Healy and Palepu (2001)), alleviating information asymmetry and, consequently, lowering the firm's cost of capital. Additionally, prior studies provide evidence on how a firm's capability to access public debt markets, implied either by the existence of firm credit rating[1] or rating level,[2] can influence capital structure or investment decisions. In this respect, Koziol and Lawrenz (2010) argue that, due to the existence of rating-triggered events, like step-up bonds, loss of access to the commercial paper market and strategic advantages in bidding for contracts, credit ratings exert influence on firm capital structure decisions.

In turn, the capital structure decision has been proven to be of great importance in the corporate financing decision of merger and acquisition (M&As) investments. Bidding firms conduct M&As by using either cash or stock as the sole consideration in the transaction, while some transactions employ a mixture of cash and stock means of payment.[3] A growing body of prior M&A studies has provided evidence that cash-financed acquisitions are to a great extent funded by debt.[4] Moreover, in the literature which relates investment decisions with financial constraints, Fazzari, Hubbard, Petersen, Blinder and Poterba (1988) argue that information asymmetry influences firm investment decisions because it creates financial constraints in the credit markets. Along these lines, Whited (1992), Gilchrist and Himmelberg

[1] See Cantillo and Wright (2000), Faulkender and Petersen (2006), Lemmon and Zender (2010), Mittoo and Zhang (2008) and Harford and Uysal (2013)).
[2] See Diamond (1991), Bolton and Freixas (2000), Denis and Mihov (2003), Rauh and Sufi (2010) and Gopalan, Song and Yerramilli (2014)).
[3] The use of cash as a method of payment in corporate takeovers was prevalent during the 1980's, followed by a decline during the 1990's, and it became popular again over the first decade of the new century (see Andrade, Mitchell and Stafford (2001) and Martynova and Renneboog (2008)).
[4] For instance, Bharadwaj and Shivdasani (2003), Faccio and Masulis (2005), Harford, Klasa and Walcott (2009), Uysal (2011) and Elsas, Flannery and Garfinkel (2013)).

(1995), Almeida, Campello and Weisbach (2004) and Campello and Chen (2010) use credit ratings as a measure of firm financial constraints in the credit markets and suggest that the existence of credit ratings reduces information asymmetry about firm value, thus lowering financial constraints. This allows firms with rated public debt to issue funds in a short notice according to their investment needs.

However, one could argue that the mere existence of a credit rating does not prove *ex-ante* that a rated firm exhibits a higher capability to borrow funds. To illustrate this, assume we have two firms A and B. Firm A has high growth opportunities and a robust financial structure, but it lacks public debt and credit rating. On the other hand, firm B has lower growth opportunities and a very low credit rating, as it faces a high debt burden and large bankruptcy costs. Obviously, in this case the unrated firm A has a higher debt capacity than firm B, despite the fact that it does not hold a credit rating. The above discussion raises two interesting questions with regards to the relationship between bidders' credit ratings, as implied by their capability to access public debt markets, and the choice of method of payment. Does the sole existence of the bidding firms' credit ratings - irrespective of the level - affect the financing decision in M&As? What is the effect of a rating level on the choice of the acquisitions' means of exchange?

Motivated by the low financial constraints of (highly) rated firms due to their relatively higher debt capacity and credit quality, we address these questions and examine the role of credit ratings in the choice of payment method in mergers and acquisitions. Pertaining to debt capacity, numerous prior studies use credit rating existence as a measure of debt capacity.[5] Accordingly, Billett, Hribar and Liu (2011) argue that firms with higher credit ratings face lower cost of debt, which, *ceteris paribus*, leads to increased debt capacity.

[5] For instance, see Cantillo and Wright (2000), Faulkender and Petersen (2006) and Lemmon and Zender (2010)).

With respect to credit quality, Liu and Malatesta (2005) and Frank and Goyal (2009) posit that the higher the level of credit ratings, the lower the information asymmetry and the adverse selection problem faced by firms. Additionally, Rauh and Sufi (2010) demonstrate that low credit quality firms appear to rely more frequently on costly forms of debt financing that include secured bank-debt with tight covenants for liquidity and subordinated public-debt relative to high credit quality firms. Moreover, evidence from studies that examine specifically the effect of credit rating levels on bond yield spreads and exposure to rollover-risk demonstrate a strong negative relationship.[6] Finally, several regulations of financial institutions and other intermediaries are directly tied to credit ratings issued by "Nationally Recognized Statistical Rating Organizations" (NRSROs) (see Kisgen (2007)). In particular, a large number of institutional investors are barred from investing in low credit rating firms or below a certain threshold (investment grade) due to concerns related with investors' wealth protection. Thus, firms with high levels of credit ratings overcome these regulatory constraints and face a wider "investor base" when seeking to borrow funds in order to finance specific investment projects.

In this study, we use a sample of US acquisitions of publicly traded bidders over the period 1998-2009 in order to explore our main hypotheses which are summarized as follows: 1) bidders holding a credit rating should have better access to public debt markets. Therefore, this lack of financial constraints makes them less reluctant to spend their cash today as it will be relatively easier for them to borrow "fresh cash" in the future whenever needed.[7] However, this hypothesis does not take into account the full dimensions of a firm's debt capacity condition as analyzed above. In fact, the mere existence of bidding firms' credit

[6] See West (1973), Liu and Thakor (1984), Ederington, Yawitz and Roberts (1987), Ziebart and Reiter (1992), Chen, Lesmond and Wei (2007) and Gopalan, Song and Yerramilli (2014)).

[7] Note that cash used in M&A transactions may be sourced either from past operations or from additional debt; the source of accumulated cash is beyond the scope of this paper. The point we wish to make here is that, irrespective of the source of cash, rated bidders might be more inclined to make use of it due to their ease of access to the credit markets in the future.

rating does not necessarily mean higher debt capacity than unrated firms and therefore does not imply *ceteris paribus* a positive relation with the use of cash financing in M&As. Hence, the sign and magnitude of the association between rating existence and cash means of exchange are matters of empirical investigation; 2) bidders with a higher credit rating level (i.e., better credit quality) face relatively better opportunities to borrow due to lower cost and higher demand for their debt securities. Therefore, we expect a positive relationship between rating level and cash method of payment in M&As.

We use different econometric methodologies to measure the probability of the choice of payment method and we find that: i) The likelihood of a cash offer or fraction of cash used as payment method in the takeover bid are not significantly associated with bidder credit rating existence; ii) The likelihood of a cash offer or fraction of cash used in the acquisition bid have a strong positive relationship with bidding firm credit rating level. In economic terms, after transforming the coefficients of our regressions into average marginal effects, one point rise in bidder rating level increases the likelihood of cash means of financing used in an M&A transaction by 7.04% over the sample average; iii) Unused debt capacity, measured with the relative credit rating level of bidder to target, also appears to be a determinant of cash financing in M&As corroborating the view that credit ratings are related with the choice of payment method in acquisitions; iv) Our main results continue to hold even after controlling for the possible endogenous nature of the main variables of interest, credit rating existence and credit rating level.

This study has several contributions in the M&As, capital structure and credit ratings literature. First, it adds to the existing literature on the determinants of method of payment, and particularly the association between a firm's credit rating and the use of cash or stock financing in acquisitions. Second, it examines both credit rating existence and credit rating level as measures of a firm's capability to access public debt markets. Third, it provides

further evidence regarding the relation between credit ratings and a firm's capital structure decisions; in particular, the financing decision in takeover bids. In general, our results imply that credit ratings mitigate information asymmetry and, consequently, reduce bidding firms' cost of capital; firms holding a high rating face lower financial constraints and can issue public debt for investment reasons with relatively less frictions. Our findings also provide further direct implications for academics and practitioners. In particular, bidding firms with high credit quality and access to public debt markets are able to make cash acquisitions and, therefore, rip the benefits related to that form of payment. More specifically, prior literature shows that bidders using cash currency enjoy non-negative abnormal returns in acquisitions of both public[8] and private targets.[9] Moreover, there is empirical evidence that the use of cash meets low target managerial resistance and deters competition from rival bidders during takeover contests.[10]

This study is related to a number of previous works, for instance, those that examine the determinants of the method of payment choice.[11] In particular, Faccio and Masulis (2005), Harford, Klasa and Walcott (2009) and Uysal (2011), who investigate the impact of a firm's debt capacity on the cash-stock choice of payment are more directly related to our work. Faccio and Masulis (2005) use bidder's leverage, collateral and interlocking directorships, whereas Harford, Klasa and Walcott (2009) and Uysal (2011) use the deviation from bidder's target debt ratios as a measure of debt capacity. We, instead, use credit ratings as measures of debt capacity and credit quality. Sufi (2009) examines the effect of the introduction of syndicated bank loan ratings on various firm financing and investment decisions, including

[8] See Travlos (1987), Brown and Ryngaert (1991), Moeller, Schlingemann and Stulz (2004) and Schlingemann (2004)).
[9] See Chang (1998), Moeller, Schlingemann and Stulz (2004) and Officer, Poulsen and Stegemoller (2009)).
[10] See Fishman (1989), Jennings and Mazzeo (1993), Betton, Eckbo and Thorburn (2009), and Chemmanur, Paeglis and Simonyan (2009)).
[11] See Jensen (1986), Hansen (1987), Fishman (1989), Amihud, Lev and Travlos (1990), Berkovitch and Narayanan (1990), Eckbo, Giammarino and Heinkel (1990), Martin (1996), Shleifer and Vishny (2003), Rhodes-Kropf and Viswanathan (2004), Faccio and Masulis (2005), Chemmanur, Paeglis and Simonyan (2009), Harford, Klasa and Walcott (2009) and Uysal (2011).

the decision to pay with cash for the consummation of an acquisition. In our paper, we focus on the relationship between long term bond ratings and method of payment in corporate acquisitions. More recently, Alshwer, Sibilkov and Zaiats (2011) study the relationship between financial constraints and the choice of payment method in M&As. Our study focuses particularly on the direct effects of credit ratings in the M&A financing method using several credit rating variables in the empirical analysis. Furthermore, Harford and Uysal (2014) investigate the impact of bidding firm access to bond markets, as implied by the existence of credit ratings, on the decision to initiate a takeover and shareholders' value creation. In our study, we are interested in the influence of both credit rating existence and credit rating level in a different acquisition decision; that is, the choice of payment method. Faulkender and Petersen (2006), Kisgen (2006, 2009) and Lemmon and Zender (2010) examine the effect of credit ratings on firms' capital structure. In this work, we study the impact of credit ratings on firms' financing decision – that is, in turn, related with their capital structure – in the context of M&As.

The remainder of the paper is organized as follows. Section 2 presents the determinants of the choice of method of payment in M&As documented in prior literature providing also the variables definitions used in the empirical analysis. Section 3 describes our sample. Section 4 analyzes the methodology and findings of our empirical tests. We present further robustness checks of our results in Section 5. Finally, Section 6 concludes the paper.

2. Determinants of the Method of Payment Choice and Variables Definitions

2.1 Debt Capacity, Financial Condition, Market Credit Risk and Method of Payment

Prior literature has shown that there are several factors that capture debt capacity. Faccio and Masulis (2005) use the *collateral* variable, which is the ratio of property, plant

and equipment (PPE) to book value of total assets at the year-end prior to the acquisition announcement to proxy for debt capacity. Hovakimian, Opler and Titman (2001) report a strong positive effect of tangible assets to the firm's level of debt. The bidder's size is another variable of relevance, as larger firms are more diversified and, hence, have a lower probability of default, enabling them to issue more debt. To account for this effect, the variable *size* is used, which is the natural logarithm of the market value of equity 4 weeks prior to the acquisition announcement. Furthermore, financial leverage controls for bidder's financial condition. The variable *leverage* is measured by the ratio of a firm's total financial debt (long-term debt plus debt in current liabilities) to the book value of total assets in the fiscal year prior to the acquisition announcement. The predicted sign of this variable is ambiguous as Faccio and Masulis (2005) find a negative association between leverage and the likelihood of cash, while Harford, Klasa and Walcott (2009) report a positive relation. Finally, in order to capture the effect of market credit conditions, Harford (2005) uses the variable *interest rate spread*, which is the spread between the average rate on commercial and industrial loans and the Federal Funds rate. This variable is provided by the Federal Reserve Senior Loan Officer's (SLO) survey and proxies for the ease of financing or credit constraints in the economy.[12] When the spread is low, and therefore firms face relatively lower cost of debt capital, the likelihood of cash acquisition should be higher. Therefore, a negative relationship between the interest rate spread and the likelihood of cash deals is predicted.

2.2 Growth Opportunities, Market Timing and Method of Payment

The investment opportunities theory posits that a relation between acquirer valuation and mode of acquisition exists, as long as the firms with more growth opportunities avoid

[12] We also use in our empirical analysis additional proxies of market credit conditions; these are the yield spread between BBB-AAA bonds (see Longstaff (2004)) and the corporate yield spread (see Duffee (1998)). The bond data for the construction of the latter (i.e., corporate yield spread) were collected from TRACE database, and start from 2002. Our general results are qualitatively similar.

underinvestment problems caused by high levels of debt finance; in response to that, they prefer to use stock (see Martin (1996) and Jung, Kim and Stulz (1996)). To proxy for growth opportunities, the bidder's book to market ratio is used and a positive relationship with the likelihood of a cash consideration is expected. The variable *book-to-market* is defined as the book value of equity at the fiscal year-end prior to the acquisition announcement divided by the market value of equity 4 weeks prior to the acquisition announcement.

Moreover, according to the market overvaluation theory (see Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004)), acquirers favor stock acquisitions when their equity is relatively overvalued to target firms' equity in order to decrease acquisition costs. Faccio and Masulis (2005) use *run-up* to measure bidder overvaluation. *Run-up* is the bidder market-adjusted buy-and-hold returns over the period (-205, -6) days prior to the acquisition announcement.

2.3 Asymmetric Information, Target Status and Method of Payment

Hansen (1987) and Chemmanur, Paeglis and Simonyan (2009) suggest that bidder information asymmetry plays a significant role in the choice of payment method in M&As. Particularly, in cases where bidders possess proprietary information about their own value, they are more likely to use stock when their firm stock is considered relatively "overvalued" and cash when their firms' stock is considered relatively "undervalued". Accordingly, the higher the degree of information asymmetry faced by target firms when evaluating bidders' offer, the higher the likelihood of accepting a cash offer as the acceptance of bidder's equity might turn out to be a costly option if the bidder is overvalued. To control for information asymmetry, we employ the variable *number of analysts*, which is the number of analysts following the firm as reported by IBES for the last month of the fiscal year preceding the acquisition announcement. For firms that are not covered by the IBES database, we assume

that the number of analysts is zero and assign this number in our estimations.[13] Chemmanur, Paeglis and Simonyan (2009) argue that the greater the number of analysts the lower the information asymmetry about firm value.

Additionally, Faccio and Masulis (2005) take into account the effect of target status on the choice of payment method. This is justified on the grounds that in deals where an unlisted target is involved, the seller's consumption/liquidity needs have to be considered. These sellers are likely to prefer cash due to the illiquid and concentrated nature of their portfolio holdings in a timely attempt to cash out their wealth opportunities. To capture target status, the *private* variable is used, which is an indicator variable taking the value of 1 for an unlisted target and 0 otherwise.

2.4 Firm Control, Monitoring and Method of Payment

In the spirit of Stulz (1988) and Jung, Kim and Stulz (1996) the likelihood of losing control in their firm leads managers to prefer debt or internal resources relative to equity when deciding to finance an acquisition; this is due to the fact that issuance of new stock is likely to dilute their stake in the bidding firm leading to a loss of control and outside intervention. Thus, managers with higher ownership stakes in the bidding firm are more likely to use cash as a payment form in takeover bids (see Amihud, Lev and Travlos (1990), Martin (1996), Ghosh and Ruland (1998) and Faccio and Masulis (2005)).

Furthermore, Shleifer and Vishny (1997) and Burkart, Gromb and Panunzi (1997) argue that blockholders can monitor the action of corporate managers which helps align the interests of managers and shareholders and leads to better corporate performance. Among others, one of the major actions that large investors can take to improve corporate

[13] Following Krishnaswami and Subramaniam (1999), we also use other measures of information asymmetry such as the *analysts forecasts' error* and the *standard deviation of analysts' forecasts* with data retrieved from IBES for the last month or three last months of the fiscal year preceding the acquisition; our results remain qualitatively similar.

performance is to advise and put pressure on bidder's managers to proceed to a potential bid or abandon it. These actions include judgments about the terms of the acquisition bid such as the choice of the payment method. To capture these effects, the variable *blockholder ownership* is employed, which is a measure of the aggregate holdings of blockholders who own at least 5% of the firm's stock. We anticipate that the likelihood of pure stock takeover deals should be lower when blockholdings are higher.

2.5 Pecking Order, Free Cash Flow and Method of Payment

Myers (1984) argues, in his pecking order theory, that managers follow a financing hierarchy; that is, they use firstly internal finance, then debt, and finally external equity financing. Moreover, Jensen (1986) states that firms with large amounts of free cash flow are likely to conduct value destroying acquisitions with cash. In particular, firms with large amounts of cash, cash flow or sufficient amount of debt capacity are more likely to use cash to finance their various investment projects. To control for this effect, *cash flows to assets* variable is used, which represents the income before extraordinary items plus depreciation minus dividends on common and preferred stock divided by firm's book value of total assets at the fiscal year-end immediately prior to the acquisition announcement. We expect a positive association between this variable and the likelihood of a cash acquisition.

2.6 Hostility, Competition, Mode of Acquisition, Relative Size, Intra-Industry Deals and Method of Payment

In addition, the characteristics of a takeover deal might have an influence on the payment method. In hostile acquisitions or in cases where more than one bidders compete for a particular target, the bidder might want to consummate the deal relatively quickly and deter competition (see Fishman (1989) and Berkovitch and Narayanan (1990)) thus choosing cash

as medium of exchange. Therefore, *hostile deals* variable is used, which is an indicator variable taking the value of 1 for hostile acquisitions and 0 otherwise. The variable *competition* proxies for the degree of competition the bidder faces during a takeover; this is an indicator variable taking the value of 1 when more than one bidders enter the bidding contest and 0 otherwise.

Furthermore, cash is also preferred in tender offers when the bidder incumbent management desires to close the deal earlier. That is because tender offers with stock must be made in accordance with the Securities Act of 1933, which entails a substantial delay, mainly because the registration statement must be reviewed by the SEC (see Martin (1996)). *Tender offers* is a dummy variable taking the value of 1 for acquisitions labeled as tender offers in Thomson Financial SDC and 0 otherwise.

Moreover, the likelihood of using cash is likely to decrease by the size of the target relative to the bidder, because it is more difficult to raise large amounts of cash as the size of the deal increases to very high levels. To control for this effect, Harford, Klasa and Walcott (2009) employ the variable *relative size*. *Relative size* is defined as the value of the transaction divided by bidder market value of equity 4 weeks prior to the acquisition announcement.

Finally, the industry diversification effect is another important determinant of the choice of the payment method. Faccio and Masulis (2005) argue that in unrelated industries in which sellers are not well acquainted with the industry risks and prospects of the bidder's business sector, they should be relatively more reluctant to accept stock as a method of payment, primarily because of bidder's overvaluation risk. In this case, sellers are likely to prefer cash in order to mitigate the overvaluation problem. To capture this effect, the *diversifying deals* variable is used, which is a dummy variable taking the value of 1 for inter-

industry transactions, and 0 for intra-industry transactions. Industries are defined at the 2-digit SIC level from the Thomson Financial SDC.

3. Sample and Data

3.1 Sample Selection Criteria

We download a sample of US domestic acquisitions announced over the period January 1, 1998 and December 31, 2009 from the Thomson Financial SDC Mergers and Acquisitions Database. The start date of the sample was driven by the availability of data for all variables used in the empirical analysis.[14] The sample consists of both successful and unsuccessful deals. We require deals to have non-missing transaction value and payment method information. Bidders are listed firms and targets are either listed or private firms. The original sample includes 13,048 deals. We remove from the sample all deals classified as repurchases, liquidations, restructurings, divestitures, leveraged buyouts, reverse takeovers, privatizations, bankruptcy acquisitions and going private transactions. This reduces the sample to 10,828 observations. Furthermore, to include in the sample deals that represent a transfer of control, we require that the bidder owns less than 10% of target shares before the announcement and seeks to acquire more than 50% after the acquisition. There are 10,166 transactions that meet these criteria. Furthermore, we drop deals worth less than US$ 1 million and less than 1% of a bidder market value to avoid noise in the analysis. Eventually, there are 6,819 deals that satisfy the above requirements.

Credit rating information for the bidder is collected from COMPUSTAT. Credit ratings represent the Standard & Poor's (S&P) long-term domestic issuer credit ratings. In our sample, the highest level of bidder one month prior to the acquisition announcement is AAA

[14] Specifically, this is due to availability of blockholder ownership data from the Thomson ONE ownership database. This database provides ownership data starting from 31st March 1997 and therefore we prefer to start our sample from 1st January 1998 in order to have a more coherent collection of years. In fact, our main results are similar when we include the remaining observations of the year 1997.

and the lowest is CCC. Out of the 6,819 transactions, 1,747 transactions involve bidders with a credit rating and 5,072 transactions with unrated firms. The main variables of interest are i) the *rating existence*, which is an indicator taking the value of 1 if a bidding firm has a credit rating one month prior to the acquisition announcement, and 0 otherwise; and ii) the *rating level*, which is an ordinal variable ranging from 1 to 22.[15,16]

3.2 Sample Statistics

Table 1 presents descriptive statistics for the overall sample and by payment method (i.e., more than 50% cash and less than 50% cash). For the entire sample of 6,819 acquisitions, 3,156 targets are acquired with more than 50% cash and 3,583 acquisitions comprise less than 50% cash means of transaction. There are also 80 acquisitions that are financed exactly with 50% cash and 50% stock. Panel A demonstrates bidder specific characteristics, which appear to differ between the two payment types. The proportion of bidders holding a credit rating (*rating existence*) is higher in cash-dominated financed deals (27.79%) than bidders in acquisitions with less than 50% cash (24.11%). The mean difference is statistically significant at the 1% level. Mean bidder *size* for cash-dominated deals is US$ 3,672.396 million, whereas the average bidder size for non-cash dominated deals is larger (US$ 5,092.108 million). Bidders in cash-dominated deals have significantly higher mean and median *leverage* and *collateral* relative to bidders in non-cash dominated deals. Furthermore, bidders *book-to-market* mean (median) ratio is significantly higher in cash-financed acquisitions 0.530 (0.417), than in acquisitions with less than 50% cash (0.442 (0.339)), which is consistent with the growth opportunities story. Additionally, bidders mean (median) *run-up* is significantly lower in cash deals (0.010 (-0.069)) relative to non-cash

[15] A higher rating level corresponds to a larger number (i.e., 22 for AAA and 1 for D – in our case the lowest number is 5 as the lower credit rating level is CCC).
[16] In the robustness checks section we also proxy for bidders' credit quality by using a dummy variable for investment-grade firms (i.e., firms with a credit rating BBB- or above).

dominated acquisitions (0.209 (-0.027)). The figures from the *run-up* variable support the overvaluation theory. Regarding *blockholder ownership*, in cash acquisitions bidders have relatively more concentrated ownership with a mean (median) of 25.97% (22.63%), while in non-cash dominated deals they are more widely diffused (17.59% (11.82%)). This finding is in line with the corporate control hypothesis. *Cash flows to assets* is significantly higher in cash acquisitions with a mean (median) of 0.052 (0.074) than in non-cash dominated acquisitions (-0.046 (0.013)), in support of the free cash flow hypothesis. Finally, the *number of analysts* does not appear to differ between the two methods of payment.

Panel B presents the statistics for target characteristics. Target mean (median) *leverage* is significantly lower in cash deals (0.174 (0.108)) than in non-cash dominated deals (0.204 (0.153)). Concerning target *book-to-market* ratio we are not able to establish a significant mean or median difference between the two methods of payment. Additionally, target mean and median *blockholder ownership* and *profitability* are significantly higher in cash deals than in non-cash dominated financed deals. Regarding target firm *number of analysts*, it seems to be significantly higher in non-cash dominated deals than cash acquisitions.

Panel C presents the statistics for deal-specific characteristics, which, again, appear to differ between the two financing categories. The mean (median) *interest rate spread* is significantly higher in cash-financed acquisitions 2.188 (2.120), than in less than 50% cash financed acquisitions (2.090 (2.050)). The average (median) size of the target relative to the bidder (*relative size*) is lower for cash deals 23.0% (8.6%), than the relative size of non-cash dominated deals 33.2% (13.0%). Consistent with our previous analysis, the percentage of bidders and targets being in the same industry is lower for non-cash dominated deals (34.22%), while cash deals have a higher proportion of diversifying deals (38.47%). The statistics for the *hostile* deals support the mode of acquisition hypothesis as the percentage of hostile acquisitions is higher in cash deals (2.19%) than in less than 50% cash acquisitions

(0.81%). Moreover, 8.40% of cash-financed acquisitions represent *tender offers*, while only 1.28% of non-cash dominated form of financing are tender offers. In cash deals the percentage of acquisitions of *private* targets accounts for 72.66% of the overall sample, while in non-cash dominated deals acquisitions of private targets represent the 57.10% of the overall sample. Finally, the *number of bidders* is significantly higher, on average, in cash deals (1.035) than in non-cash dominated deals (1.024).

[Please Insert Table 1 About Here]

Table 2 presents the descriptive statistics by rated and unrated bidders. The statistics from this table will shed further light on the relation between the method of payment and credit ratings. Panel A presents bidder characteristics. Rated bidders are, on average, larger (US$ 12,920.240 million) than unrated ones (US$ 1,508.230 million). Further, rated bidders have significantly higher mean and median *leverage*, *collateral*, *book-to-market* and lower mean and median pre-acquisition *run-up* than unrated bidders. The average (median) *blockholder ownership* is lower for the rated bidders (18.30% (13.88%)) relative to the unrated ones (22.90% (18.71%)). Finally, rated bidders also exhibit higher mean and median *cash holdings* and *number of analysts* than bidders without a credit rating.

Panel B reports statistics for targets characteristics by rated and unrated bidders. Target firms receiving bid offers by rated bidders appear to have higher mean and median *leverage*, *book-to-market*, *number of analysts* and *profitability* ratios than target firms associated with unrated bidders.

With respect to deal characteristics, the relative size of the transactions appears to differ as the median value of the rated group is 0.086 and is significantly lower than the unrated group (0.111). Further, in the rated group the mean (median) fraction of cash that is used as method of payment is greater (0.506 (0.505)) than the unrated group (0.457 (0.424)). Concerning hostile acquisitions and tender offers, rated bidders execute more deals of these

types compared to unrated ones. Finally, we find that rated bidders are involved in less private deals and face a higher degree of competition in the takeover contest than unrated ones.

[Please Insert Table 2 About Here]

From the analysis so far, we have noticed that rated bidders have, for instance, significantly larger size and higher leverage, among others, than unrated bidders. Additionally, size and leverage are important determinants of the financing method in M&As. Therefore, in order to establish a more concrete statistical relationship and uncover the net effects of the credit rating variables, we present, in the next section, multivariate analysis controlling for several determinants of the choice of payment method.

4. Empirical Analysis

4.1 Fractional Logit Regressions and Probit Regressions

In order to investigate the relationship between credit ratings and the choice of payment form in acquisitions, we firstly use as dependent variable the fraction of cash as part of the total price offered by the bidder. Since by definition this variable is a fractional response and lies in the interval [0, 1], we follow Papke and Wooldridge (1996) and use a Generalized Linear Model (GLM) Logit regression where the parameters of the model are obtained by the Quasi-Maximum Likelihood Estimator (QMLE).

Furthermore, we try to distinguish the qualitative nature of the choice of the medium of payment by using Probit regressions. The parameters of the Probit model are computed with the method of Maximum Likelihood Estimator (MLE). In this respect, our dependent variable takes the value of 1 for deals financed with more than 50% cash and 0 for deals financed with

more than 50% stock. Table 3 presents the results for the fractional Logit and Probit regressions.[17]

4.1.1 Credit Rating Existence and Method of Payment

Initially, we examine the relation between bidder credit rating existence and method of payment by controlling for various bidder-, and deal-specific characteristics. All regressions also control for year and industry fixed effects whose coefficients are suppressed.[18] Additionally, we use heteroskedasticity-robust standard errors adjusted also for bidder clustering due to the presence of repeated acquirers in our sample.[19] Table 3 presents the results, in which the first main variable of interest is the *rating existence*. Specification (1) presents the estimates for the (GLM) Logit and specification (2) the estimates for the Probit model. Noticeably, we observe that the relationship between cash deals and rating existence is insignificant at conventional levels. This finding is in line with our prediction that the mere existence of credit rating does not prove *ex-ante* the superior debt capacity of rated firms.

Additionally, in our regression we are able to confirm the results from the past literature as we find that most of our control variables have a significant relationship with the cash consideration. More specifically, the independent variable that captures firm's financial condition (i.e., *leverage*) carries a positive and significant coefficient. *Book-to-market* is consistent with the growth opportunities theory as it is positively related with the use of cash. Further, we are able to confirm the market timing hypothesis, since we find that *run-up* is

[17] A benefit of a Probit regression is that it allows us to focus on the qualitative decision of firms to finance with cash or stock. In many mixed deals the acquirer does not always specify the actual percentage of cash financing, as target shareholders are offered with a choice of cash or stock financing. Thus, the decision can also be specified as choosing among cash, stock or a mixture. In that respect, an Ordered Probit regression is preferred, in which the dependent variable is 0 for pure stock deals, 1 for mixed deals, and 2 for all cash deals as in Faccio and Masulis (2005); using this type of regression, our results are qualitatively similar.

[18] We define industries according to the Fama-French 12 industry classification codes, retrieved from the website of Kenneth French (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html).

[19] Our results should not be affected by any potential multicollinearity, given the large sample size with sufficient variation in our explanatory variables. We still perform a multicollinearity (VIF) test for all specifications throughout the paper and find that correlation between explanatory variables does not have any material effect on our estimates.

negatively associated with cash method of payment. That is firms with high pre-acquisition valuations are less likely to use cash in the transaction. In addition, we find that the higher the concentration of ownership the more likely the use of cash consideration, as *blockholder ownership* holds a positive and statistically significant coefficient at conventional levels. The free cash flow hypothesis is also supported by our results; *cash flows to assets* variable carries a positive and significant coefficient at the 1% significance level. With respect to information asymmetry, we corroborate the past literature and find that the bidder *number of analysts* is negatively associated with the use of cash. *Relative size* is negatively related with the use of cash in M&As, while the target *private* status is positively associated with cash financing. Lastly, we document that in *hostile* and *tender offer* deals, cash is more likely to be the means of payment.

[Please Insert Table 3 About Here]

4.1.2 Credit Rating Level and Method of Payment

In the previous section we documented that when we take into account a variety of factors known to affect the method of payment decision, there is no significant relationship between the existence of credit ratings and the use of cash. In this section, we attempt to shed light on our second research question: How is credit quality related with the method of payment in M&As? In this respect, we use the *rating level* as our main variable of interest. Table 3 (specifications (3) and (4)) presents the results for this analysis. First, in specification (3) we present the results for the fractional Logit regression where the dependent variable is the fraction of cash used during acquisitions. Our main variable of interest has a positive and significant coefficient at the 1% significance level. Consistent with our prediction, the higher the credit rating level, the higher the likelihood of a cash acquisition. This result has a strong economic significance, as one point rise in the rating level increases the likelihood of using

cash mode of payment in acquisitions in our overall sample by 7.04%.[20] From the remaining control variables, *size, cash flows to assets, relative size, hostile, tender offers* and *private* acquisitions carry significant coefficients at conventional levels with signs consistent to the prior M&A literature.

In specification (4), we examine the relation between rating level and the likelihood of cash by using the results of the Probit regression where the dependent variable is the choice between deals financed with more than 50% cash and deals financed with more than 50% stock. The rating level is positive and significant at the 1% significance level, controlling for all other bidder and deal-specific characteristics.[21] Overall, the results from this section support our conjectures for the positive impact of credit rating level on the probability to use cash financing in acquisitions.

4.2 Unused Debt Capacity and Method of Payment

Myers and Majluf (1984) propose a specific financial rationale for M&As based on the complementary fit between different levels of debt capacity of bidders and targets. Bruner (1988) concentrates particularly in the case in which target firms with increased growth opportunities face capital constraints regarding the financing of their investment opportunities; the author suggests that it always pays for a bidder with higher debt capacity and lower growth opportunities to acquire a capital constrained target, since the higher debt capacity of the combined firm will help the firm to put forward all the positive NPV projects that the constrained firm might pass up. On the other hand, Smith and Kim (1994) empirically document that the positive effect of unused debt capacity materializes from the

[20] This is estimated by calculating average marginal effects and dividing the coefficient of our main independent variable of interest to the mean value of the percentage of cash that is used for acquisitions in our total sample.
[21] We also put as dependent variable the value of 1 for deals with more than 50% stock and 0 for deals financed with more than 50% cash and find the opposite result. In particular, the dependent variable experiences a negative relationship with rating levels, implying that stock method of payment is a decreasing function of rating levels.

opposite direction; that is, a capital constrained bidder acquires an unconstrained target. Hence, considerations of unused debt capacity between the merging firms can influence the likelihood of using cash as a method of payment; this is mainly due to the fact that the unused debt capacity in one of the two merging parties will lead bidders to use cash for the consummation of the deal, since any increase in leverage associated with cash payments will be absorbed by the unused debt capacity of the combined firm.

To capture the effect of unused debt capacity and the potential non-linear relationship with the usage of cash, we propose the *unused debt capacity* variable, which measures the difference in debt capacity between the two merging participants and is computed by using the ratio of the two merging firms' credit rating levels. Specifically, for the cases where the bidder holds a higher credit rating than the target, the unused debt capacity is equal to the ratio (Bidder Rating/Target Rating), whereas in the cases where the target holds a higher rating than the bidder the independent variable is equal to the ratio (Target Rating/Bidder Rating). This approach results in a continuous variable with a minimum value of 1 (where credit ratings are exactly the same for merging parties) and larger values indicate greater unused debt capacity irrespective of whether it comes from the bidder's side or from the target's side.[22] Furthermore, we follow Bruner (1988) and create an interaction variable between *unused debt capacity* and *relative size* of the deal. This can be justified by the fact that the impact of unused debt capacity of the merging firms on the choice of cash method of payment should decrease in large transaction values, since it is more difficult to raise large amounts of cash as the size of the deal increases to very high levels. It is worth mentioning that in our sample of 353 deals where both bidders and targets possess a credit rating, roughly 69% of the deals consists of bidders with a higher credit rating level than targets with a mean

[22] We acknowledge an anonymous referee for suggesting this variable.

(median) value of 1.21 (1.13). This is translated in bidders holding approximately 3 (2) notches higher credit ratings than targets.

Table 4 presents the results for this analysis, which runs a (GLM) Logit regression in model (1) and a Probit regression in model (2). We notice that the number of observations reduces significantly due to the requirement that target firms should also hold a credit rating, which leaves private deals out of this analysis. In specification (1) the *unused debt capacity* coefficient is positive and statistically significant at the 5% level. This result confirms our prediction for the existence of a non-linear relationship between the unused debt capacity of the merging parties and the choice of payment method. Furthermore, the estimate from the interaction variable suggests that the incremental effect of unused debt capacity on the proportion of cash financing is not affected by the relative size of the deal. In specification (2) we run the same analysis for the Probit regression and the coefficient on the *unused debt capacity* is again positive and significant at the 5% level. Overall, the results imply that the existence of unused debt capacity constitutes a determinant of the use of cash as a method of payment in M&As lending further support to the importance of credit ratings in the choice of acquisition financing.

[Please Insert Table 4 About Here]

5. Further Robustness Tests

In the previous analysis we provided evidence that firms with high credit quality (i.e., firms holding a higher credit rating) are more likely to use cash or a higher fraction of cash when they finance an acquisition, while we did not find any strong evidence of a relationship between the choice of cash method of payment and credit rating existence. In this section, we offer additional auxiliary tests to check the validity of our findings.

5.1 Investment-Grade Vs Speculative-Grade Firms

In order to shed further light on the relationship between credit rating quality and the choice of payment method in M&As, we investigate, for robustness reasons, the impact of investment grade credit ratings. Investment-grade firms are the ones rated with BBB- or above as in An and Chan (2008). These firms are, in general, of higher creditworthiness relative to the speculative-grade firms (i.e. firms with a credit rating below BBB-). In this respect, Longstaff, Mithal and Neis (2005) and Chen, Lesmond and Wei (2007) demonstrate that investment grade firms generate lower bond yield spreads relative to the speculative grade ones. Additionally, Molina (2005) and Almeida and Philippon (2007) empirically document that default costs are considerably lower for investment-grade firms than for the speculative-grade ones. Furthermore, due to the absence of regulation restrictions regarding allocations in securities of investment grade firms (see Kisgen (2007) and Kisgen and Strahan (2010)) these firms enjoy a larger clientele base and a higher demand for their debt securities. If investment grade firms face lower cost of debt capital and have a wider access to investors, then it is plausible that they are able to borrow more and use cash more frequently as a method of payment in a takeover deal. Thus, we create the variable *investment grade* dummy taking the value of 1 for firms rated BBB- and above, and 0 otherwise. Table 5 reports the results.

In specification (1) the dependent variable is the fraction of cash as part of the total price offered by the bidder and in specification (2) the dependent variable is the choice between more than 50% cash and more than 50% stock consideration. In both specifications we also incorporate the control variables employed in previous analyses. The coefficient of the *investment grade* carries a positive and significant coefficient at the 1% significance level in both specifications. In economic terms, being an investment grade bidder increases the likelihood of using cash as a payment form by 19.68% over our sample average. Overall, the

results of this analysis add further support to our hypothesis that firms with high credit quality are more likely to use cash financing in M&As.

[Please Insert Table 5 About Here]

5.2 Endogeneity Control

So far, in our analysis we treated the credit rating variables as exogenous to our model; that is the decision to obtain a credit rating and the level of credit ratings are randomly allocated across our sample firms. However, Liu and Malatesta (2005), An and Chan (2008) and Harford and Uysal (2014) argue that firms determine, at least partially, whether to obtain a credit rating or have a higher rating level after considering the benefits against the potential costs. Therefore, it is likely that the decision to obtain a (high) credit rating is based on firm specific characteristics and failure to account for these characteristics would lead to biased estimates in our analysis. Since in our case one of the dependent variable has a discrete nature (*cash-dominated*) and the Endogenous Explanatory Variables (EEVs) *rating existence* and *rating level* are of discrete and continuous nature respectively, we apply several econometric methodologies to control for endogeneity bias. In the case of *rating existence* we use: i) a Bivariate Probit model; and ii) a Control Function approach. The Bivariate Probit model uses Maximum Likelihood Estimation (MLE) and estimates the selection and structural equations simultaneously. MLE estimation is more efficient than classic two-stage procedures when the error terms on the selection and structural equations have a bivariate normal distribution (An and Chan (2008). Alternatively, another approach that can tackle the issue of endogeneity when both dependent and explanatory variables are discrete is the two-step Control Function Approach, which has been suggested by Wooldridge (2002). Control Function estimators firstly calculate the model of endogenous regressors as a function of instruments, like the "first stage" of Two Stage Least Squares (2SLS), and then use the errors from the reduced

model as an additional regressor in the structural model. If the coefficient of the included error is not statistically significant, then the null hypothesis of no endogeneity cannot be rejected.[23]

In the case of the *rating level* which constitutes a continuous variable we employ: i) the Instrumental-Variables (IV) Probit method (see Lee (1981) and Acemoglu, Aghion, Lelarge, Van Reenen and Zilibotti (2007)), which is similar to the 2SLS method, except that the structural regression is a Probit model and not an OLS linear regression; and ii) we use the Two Stage Conditional Maximum Likelihood (2SCML) method of Newey (1987).

In order to apply all four approaches discussed above and get unbiased estimates, instruments are essential; that is variables which determine the probability of a bidder holding a credit rating or having a high rating, and concurrently are not related with the main dependent variables (*cash-dominated*) in our structural models. It is likely that factors influencing a firm's decision to access public debt markets might also influence a firm's decision to use cash as a payment method in acquisitions. In this respect, a better strategy would be to avoid firm-specific attributes that determine the probability of having a debt rating and use industry-specific attributes instead.[24] To accomplish this task we follow the literature on firms' "debt composition" and "determinants of credit rating levels" (Johnson (1997), Krishnaswami, Spindt and Subramaniam (1999), Cantillo and Wright (2000), Denis and Mihov (2003), Faulkender and Petersen (2006) and Ashbaugh-Skaife, Collins and LaFond (2006)) and use variables that have been proposed to account for these effects.

Specifically, Faulkender and Petersen (2006) and An and Chan (2008) suggest that a firm is more likely to issue a public bond and obtain a credit rating when it operates in a well established industry, since it is possible that the bond market investors already know the

[23] In that case the coefficient of the included residual captures the degree of correlation "ρ" among the residuals in the reduced and structural regressions, which is a valid and simple test of endogeneity (Wooldridge (2002)).

[24] In order to draw valid inferences and avoid any weak instrument biases when applying industry-specific instruments, in this section we do not include industry fixed effects in our regressions.

competitors and are familiar with the economic condition of the industry. Therefore, this reduces the potential costs of information collection that the banks incur when they agree to underwrite a bond issue. To control for this effect, we compute the fraction of firms with credit ratings in the same 3-digit SIC industry group at the fiscal year-end prior to the acquisition and use the log of 1 plus this fraction (*industry fraction*). Johnson (1997) and Cantillo and Wright (2000) argue that public credit markets cater to profitable or safe industries with low default risk. Obviously, bondholders prefer to invest their money in safe securities that yield a periodical interest (i.e., in effect their opportunity cost of capital), and expect at the maturity to collect normally their principal in full. Industries with high and steady cash flows face low default probability, since an abundance or low volatility of cash flows serves as a guarantee that the firms are likely to fulfill timely their debt obligations. To control for the effect of profitability we calculate the median industry profitability (defined as the ratio of earnings before interest, taxes, depreciation and amortization (EBITDA) to total assets) of bidders' same 3-digit SIC industry group at the fiscal year-end preceding the acquisition (*industry profitability*). Accordingly, to measure the impact of credit risk we use the standard deviation of the industry's profitability (*industry risk*).

Finally, a number of studies (Smith (1986), Smith and Watts (1992), Krishnaswami, Spindt and Subramaniam (1999) and Ashbaugh-Skaife, Collins and LaFond (2006)) contend that regulated firms tap the public capital markets more frequently, thus revealing firm's cost of capital, which is beneficiary for firms in the process of setting their rating. The periodic use of capital markets disciplines management and constrains their discretion in investment and operating decisions. Furthermore, these papers suggest that, relative to unregulated firms, regulated firms engage more rarely in asset substitution and underinvestment as state utility commissions and other regulatory authorities supervise managerial decisions. To sum up, it follows that firms in regulated industries exhibit low agency costs and, hence, the need for

the monitoring role of private debt is limited, a fact that leads to a higher reliance on public debt when debt capital is required. To deal with this effect, we use an indicator variable that equals with 1 if the firm is a financial institution or utility firm (1-digit SIC level 6 or 2-digits SIC level 49), and 0 otherwise (*regulated industry*).

[Please Insert Table 6 About Here]

Table 6 reports the results of this analysis. Specification (1) presents the reduced Probit model measuring the probability of having a credit rating. Two of our excluded instruments, *industry fraction* and *industry profitability* are statistically significant at the 1% significance level and have the expected signs. To examine the strength of our instruments we follow Stock and Yogo (2002) and use the *weak identification test critical values* for the "maximal IV Wald size distortion". However, as Nichols (2007) notes, these identification statistics only apply to the linear case - not the nonlinear analogs - including those estimated with generalized linear models. Therefore, in practice researchers should report the identification statistics for the closest linear analog (i.e., in our case the closest linear analog for the first stage is either a Linear Probability Model (LPM) or a Linear Regression Model and for the second stage is a Linear Probability Model (LPM)) and be careful when drawing inferences from their values.[25] In the first lower panel of Table 6, we report the *F-test* for the joint significance of the excluded instruments in the first-stage regression, and the critical values for the desired 10% size distortion on a nominal 5% Wald test, computed by the Limited Information Maximum Likelihood (LIML) estimator. The *F-test* is larger than the corresponding critical values and, hence, we can reject the null of excluded instruments' weakness. In both specifications (2) and (3) the coefficient on rating existence is insignificant at conventional levels. Finally, in the second lower panel of Table 6 we report the Wald test of endogeneity for the structural equation (2) which does not reject the null of no endogeneity

[25] This is indeed the case as the *F-test* from the Probit regression has a value of 50.30 and is significantly higher than the reported *F-test* value from the LPM regression in Table 6. This is due to the fact that the rating choice is a binary variable and the Probit regression specifies better this decision than the LPM regression.

for the *rating existence*, while in specification (3) the *rating existence residual* is statistically insignificant at conventional levels. These findings imply that the variable *rating existence* is exogenous to our model, which mitigates any concerns of confounding effects due to a potential endogeneity bias.[26]

With regards to the correction for endogeneity in the case of the variable *rating level,* we apply the IV Probit and 2SCML methods, with the rating level choice equation (OLS) being the reduced form, and the method of payment equations (Probit) being the structural forms. Additionally, we substitute the instrument *industry fraction* with the variable *industry level,* which is the median credit rating level of the bidders' same 3-digit SIC industry group at the fiscal year-end preceding the acquisition, to control for the credit quality level of the industry.

[Please Insert Table 7 About Here]

Table 7 shows the results for this analysis. In the reduced model (1) three out of the four instruments (*industry level, industry risk* and *regulated industry*) are highly statistically significant and carry the expected coefficients. Furthermore, the results from the identification statistics reject the null of excluded instruments' weakness. In both structural equations (2) and (3) the variable of interest *rating level,* is statistically significant at the 10% and 5% levels respectively. Additionally, in the second lower panel of Table 7 the results from the endogeneity tests (Hausman and Wald) show that the *rating level* is exogenous to our model. Therefore, given that we are not able to identify any existence of endogeneity bias for the rating level in these regressions, we can base our inferences on the results of Table 3,

[26] Additionally in order to control for endogeneity in the case of *rating existence* we employ two alternative approaches: 1) a propensity score matching approach using the same instruments and independent variables as in Table 6; and 2) the quasi-natural experiment in Harford and Uysal (2013) where we run regressions on a sample of firms that did not have a credit rating two years prior to the acquisition (*t-2*) but hold one at the year of acquisition (*t*). Our findings suggest that the main control variable *rating existence* is not endogenous to our sample.

in which the regressions are consistent and efficient.[27] Overall, the findings support our hypothesis of a positive association between credit rating level and the likelihood of using cash as a method of payment in acquisitions.

Finally, we follow Larcker and Rusticus (2010) and Fu, Kraft and Zhang (2012) and assess how severe must the endogeneity problem be in order to overturn our main results. It is well known that the bias produced by the omitted variable is affected by the omitted variable's correlation with the independent variable of interest and its correlation with the dependent variable. The stronger the two correlations, the more biased the coefficient estimate, where the product of the two correlations indicates the degree of the bias. Frank (2000) follows the above logic and derives the minimum correlations necessary to turn a statistically significant into an insignificant result by estimating the Impact Threshold for a Confounding Variable (ITCV). The larger (smaller) the ITCV, the more (less) robust the main results are to omitted variables concerns. Given that in our main results of Table 3 the variable *rating existence* was already insignificant, this approach is only meaningful for the case of *rating level*.

The ITCV for *rating level* is presented in Table 8. The threshold value for *rating level* is -0.072 implying that the correlations between *rating level* and *cash-dominated* with the unobserved confounding variable each only need to be 0.268 ($=\sqrt{0.072}$) for the main results to be overturned. The ITCV seems strong enough to suggest that our main results are robust to omitted variable concerns. Notwithstanding, in order to examine more analytically this issue we use our control variables to compute a benchmark for the magnitude of possible correlations involving the unobserved confounding variable. To accomplish that, we calculate

[27] It is worth noting that since we employ instruments to measure the choice of credit rating level, by construction the coefficients of rating level in the IV Probit and 2SCML regressions exhibit higher standard errors (i.e., loss in efficiency) than the regressions which do not account for endogeneity. Therefore, it is likely in some cases the rating level to appear less statistically significant at conventional levels. In support to this argument, the relatively lower significance sources from the higher standard errors, given that the coefficients of the main variable of interest in the structural regressions have similar magnitude to the ones of our main results in Table 3.

the impact for each of our control variables, that is defined as the product of the partial correlation between the x-variable and the control variable and the correlation between the y-variable and the control variable (partialling out the effect of other control variables). In column (2) we present the impact of the inclusion of each independent variable on the coefficient of *rating level*. The variable with the largest impact on the coefficient for *rating level* is *size* with a value of -0.067. This entails that we would need a confounding variable with a stronger impact than *size* to overturn our results. Specifically, the ITCV is larger than the impact of all the control variables (including *size*), and thus, taking into account that in this study we employ a good set of control variables known from the literature to affect the payment method in M&As, these results provide confidence in the estimate of the effect of *rating level* on the choice of cash method of payment in acquisitions.

In column (3) we also calculate the $Impact_{raw}$ for each of the control variables, which is based on the raw correlations instead of the partial correlations and is a more conservative measure of impact. In column (3) only two control variables (*size* and *private*) have higher impact than the relevant ITCV, which again suggests that under the assumption that we have a good set of control variables, it is unlikely that such an unobserved confounding variable exists; this implies that our main results for *rating level* are robust to omitted variables concerns. Overall, the results in Tables 7 and 8 indicate that *rating level* is positively related with the usage of cash in acquisitions, both before and after we consider potential endogeneity issues.

[Please Insert Table 8 About Here]

5.3 Target Firm Characteristics and Method of Payment

Finally, in this section, we focus on a subsample of public acquisitions and include in our regressions target firm characteristics known from the literature to affect the method of

payment in M&As. In particular, it has been suggested that a target firm's leverage (Hansen (1987)), growth opportunities (Martin (1996)), share ownership (Ghosh and Ruland (1998)), and information asymmetry (Chemmanur, Paeglis and Simonyan (2009)) exert an impact on the likelihood of using cash as a payment form. In particular, target's growth opportunities, share ownership and information asymmetry are expected to have a negative association with the choice of cash in acquisitions, while the predicted relationship of a target firm's leverage with the likelihood of using cash is ambiguous. To control for these effects we add on the top of the control variables used in the previous analysis supplementary target firm's variables (*Tleverage*, *Tbook-to-market*, *Tblockholder ownership*, *Tnumber of analysts* and *Tprofitability*) and report the results in Table 9. We use GLM Logit regressions in specifications (1) and (3) and probit regressions in specifications (2) and (4). Specifications (1) and (2) present the results in which the main variable of interest is the *rating existence* and specifications (3) and (4) show the findings for the *rating level* variable as main variable of interest. With regards to the *rating existence,* we are not able to establish any significant relationship at conventional levels; however, the *rating level* variable continues to be strongly positively associated with cash acquisitions as it carries positive and significant coefficients at the 1% level in both specifications. From the target control variables, *Tleverage, Tnumber of analysts* and *Tprofitability* are negative and statistically significant in, at least, two out of the four specifications. In a nutshell, the results of this analysis add more evidence regarding the robustness of our basic findings and imply that firms' credit quality is an important determinant of the financing decision in M&As.[28]

[Please Insert Table 9 About Here]

[28] We also employ the econometric methods discussed above for the existence of endogeneity on this set of regressions which include target firm characteristics and again we do not find any evidence of endogeneity bias.

6. Conclusion

In this paper we present direct empirical analysis of the relation between credit ratings and the choice of method of payment in mergers and acquisitions. In particular, we examine whether rating existence and rating level affect the likelihood of cash being used as a form of financing in a takeover bid. In our empirical analysis, we use different econometric approaches to examine this relationship and we are able to establish a positive relation between a bidders' credit rating level and cash payment method. The results are attributed to the lower financial constraints of firms with a high credit rating, as implied by their higher credit quality. Our investment grade results also confirm the findings on rating level analysis corroborating the view that cash method of payment is an increasing function of credit quality. Further, unused debt capacity between the counterparties appears to determine the choice of cash method of payment lending further support to the relationship of credit ratings with the financing choice. Moreover, our results have a strong economic significance and are robust even after controlling for endogeneity issues regarding the main variables of interest.

Additionally, in response to the questions raised in the introduction, the findings of this paper imply that higher capability to access public debt markets affects the choice of payment method in M&As. In particular, high credit quality, which is associated with lower cost and higher demand for debt securities, allows highly rated bidding firms to be less reluctant to use cash in an acquisition investment as it is less painful for them to find cash for new investments in the future.

This study adds to the prior literature by providing further evidence on how credit ratings affect firm capital structure decisions in general, and financing decisions in the M&As process more specifically. In particular, we establish a direct relationship of credit ratings as a determinant of the choice of payment method. The positive likelihood of using cash as a method of payment in acquisitions in which firms have high credit quality can be considered

as a high value asset for bidders' shareholders, given the well-documented fact that cash consideration is related with various beneficial outcomes for shareholders of bidding firms, such as favorable valuation effects and determent of competition in the market for corporate control. Overall, this paper highlights the role of CRAs in firm's capital structure decisions related particularly with the financing decision in takeover bids.

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Appendix A. Variable Definitions

Variable	Definition
	Panel A: Measures of Payment Form
Fraction of Cash	Fraction of cash as part of the total price offered by the bidder to the target shareholders from Thomson Financial SDC.
Cash-dominated	Dummy variable: 1 for deals financed with more than 50% cash, 0 for deals financed with more than 50% stock from Thomson Financial SDC.
	Panel B: Credit Rating Variable
Rating Existence	Dummy variable: 1 for rated bidders, 0 for unrated bidders.
Rating Level	Continuous variable for rated bidders: 1 to 22, AAA level takes 22 and D takes 1.
Investment Grade	Dummy variable: 1 for investment grade bidders (above BBB- threshold), 0 for speculative grade bidders (below BBB- threshold).
Unused Debt Capacity	The ratio of bidder to target credit rating in cases where the former is higher than the latter, and the ratio of target to bidder credit rating in cases where the former is higher than the latter.
	Panel C: Firm Characteristics
Size	Firm market value of equity 4 weeks prior to the acquisition announcement from CRSP in US$ million.
Leverage	Firm total financial debt (long-term debt plus debt in current liabilities) divided by the book value of total assets in the fiscal year prior to the acquisition announcement from COMPUSTAT.
Collateral	The ratio of firm's property, plant and equipment to total assets at the fiscal year immediately prior to the acquisition announcement from COMPUSTAT.
Book-to-Market (B/M)	Book value of equity at the fiscal year-end prior to the acquisition announcement divided by the market value of equity 4 weeks prior to the acquisition announcement. Book value of equity is from COMPUSTAT, market value of equity is from CRSP.
Run-Up	Market-adjusted buy-and-hold returns of the firm over the period starting (-205, -6) days prior to the acquisition announcement from CRSP.
Blockholder Ownership	Aggregate holdings of blockholders who own at least 5% of the company's stock from Thomson One ownership database.
Cash Flows to Assets	Income before extraordinary items plus depreciation minus dividends on common and preferred stock divided by the total assets at the fiscal year-end immediately prior to the announcement from COMPUSTAT.
Number of Analysts	The number of equity analysts following the firm replaced by 0 for firms not covered by IBES.

Profitability	The ratio of earnings before interest, taxes, depreciation and amortization (EBITDA) to total assets at the fiscal year immediately prior to the acquisition announcement from COMPUSTAT.
	Panel D: Deal Characteristics
Interest Rate Spread	The spread on the interest rate charged for all industrial and commercial loans over intended federal funds rate. The spread is from the Survey of Terms of Business Lending published by the Federal Reserve Bank of New York in its E2 release.
Relative Size	The ratio of the deal's value to bidder's market value of equity 4 weeks prior to the acquisition announcement from CRSP in US$ million.
Diversifying Deals	Dummy variable: 1 for inter-industry transactions, 0 for intra-industry transactions. Industries are defined at the 2-digit SIC level from Thomson Financial SDC.
Hostile Deals	Dummy variable: 1 for deals defined as "hostile" or "unsolicited" by Thomson Financial SDC, 0 otherwise.
Tender Offers	Dummy variable: 1 for tender offers from Thomson Financial SDC, 0 otherwise.
Private	Dummy variable: 1 for private targets from Thomson Financial SDC, 0 otherwise.
Number of Bidders	Number of bidders during the takeover deal from Thomson Financial SDC.
Competition	Dummy variable: 1 if more than one bidders enter the contest, 0 otherwise.
	Panel E: Instrumental Variables
Industry Fraction	Log of 1 plus the fraction of firms in the same 3-digit SIC industry group that have credit ratings at the fiscal year-end immediately prior to the acquisition announcement from COMPUSTAT.
Industry Profitability	The median ratio of earnings before interest, taxes, depreciation and amortization (EBITDA) to total assets of firms in the same 3-digit SIC industry group at the fiscal year-end immediately prior to the acquisition announcement from COMPUSTAT.
Industry Risk	The standard deviation of the ratio of earnings before interest, taxes, depreciation and amortization (EBITDA) to total assets of firms in the same 3-digit SIC industry group at the fiscal year-end immediately prior to the acquisition announcement from COMPUSTAT.
Industry Level	The median credit rating level of firms in the same 3-digit SIC industry group at the fiscal year-end immediately prior to the acquisition announcement from COMPUSTAT.
Regulated Industry	Dummy variable: 1 if firm is a financial institution (1-digit SIC level 6) or a utility firm (2-digit SIC level 49), 0 otherwise.

Table 1

Sample Descriptive Statistics by Payment Method

The table presents descriptive statistics for a sample of US public and private acquisitions announced over the period between January 1, 1998 and December 31, 2009 drawn from the Thomson Financial SDC Mergers and Acquisitions Database. The sample is further classified by the method of payment used in the transaction. The financing category "Cash>50%" includes payments where the percentage of cash used is more than 50%. The financing category "Cash<50%" includes payments consisting of less than 50% cash. Panels A, B and C describe the mean and median values for bidder-, target- and deal-specific characteristics, respectively. Credit ratings represent the Standard & Poor's (S&P) long-term domestic issuer credit ratings from COMPUSTAT. Stock price data is from CRSP, accounting data is from COMPUSTAT. All variables are defined in Appendix A. Statistical tests for differences in means and equality of medians for each characteristic between the two methods of payment are also presented in parentheses.

			Method of Payment					
	Total Sample (N=6,819)		(1) Cash>50% (N=3,156)		(2) Cash<50% (N=3,583)		Difference (1) – (2)	
Variable	Mean	Median	Mean	Median	Mean	Median	Mean (p-value)	Median (p-value)
Panel A: Bidder Characteristics								
% Rating Existence	25.620	-	27.788	-	24.114	-	(0.000)	-
Size (in US$ million)	4,431.941	491.321	3,672.396	499.581	5,092.108	491.973	(0.002)	(0.875)
Leverage	0.182	0.133	0.189	0.149	0.175	0.124	(0.004)	(0.001)
Collateral	0.351	0.241	0.364	0.256	0.339	0.226	(0.008)	(0.001)
Book-to-Market	0.484	0.377	0.530	0.417	0.442	0.339	(0.000)	(0.000)
Run-Up	0.114	-0.050	0.010	-0.069	0.209	-0.027	(0.000)	(0.001)
% Blockholder Ownership	21.652	17.190	25.966	22.630	17.588	11.820	(0.000)	(0.000)
Cash Flows to Assets	0.001	0.049	0.052	0.074	-0.046	0.013	(0.000)	(0.000)
Number of Analysts	0.601	0.000	0.581	0.000	0.620	0.000	(0.392)	(0.435)
Panel B: Target Characteristics								
Leverage	0.192	0.135	0.174	0.108	0.204	0.153	(0.003)	(0.000)
Book-to-Market	0.732	0.525	0.737	0.553	0.730	0.513	(0.902)	(0.042)
% Blockholder Ownership	21.000	16.110	26.770	24.040	17.95	11.990	(0.000)	(0.000)
Number of Analysts	0.534	0.000	0.401	0.000	0.612	0.000	(0.004)	(0.117)
Profitability	0.030	0.057	0.057	0.089	0.014	0.034	(0.000)	(0.000)
Panel C: Deal Characteristics								
Interest Rate Spread	2.137	2.09	2.188	2.120	2.090	2.050	(0.000)	(0.000)
Relative Size	0.283	0.105	0.230	0.086	0.332	0.130	(0.000)	(0.000)
% Diversifying Deals	36.090	-	38.466	-	34.217	-	(0.000)	-
% Hostile Deals	1.466	-	2.19	-	0.809	-	(0.000)	-
% Tender Offers	4.561	-	8.400	-	1.284	-	(0.000)	-
% Private	64.482	-	72.655	-	57.103	-	(0.000)	-
Number of Bidders	1.028	1	1.035	1	1.024	1	(0.032)	-

Table 2

Sample Descriptive Statistics by Credit Ratings

The table presents descriptive statistics for a sample of US public and private acquisitions announced over the period between January 1, 1998 and December 31, 2009 drawn from the Thomson Financial SDC Mergers and Acquisitions Database. Panels A, B and C describe the mean, median and number of observations for bidder-, target- and deal-specific characteristics, respectively, for rated and unrated bidders. Credit ratings represent the Standard & Poor's (S&P) long-term domestic issuer credit ratings from COMPUSTAT. Stock price data is from CRSP, accounting data is from COMPUSTAT. All variables are defined in Appendix A. Statistical tests for differences in means and equality of medians for each characteristic for rated versus unrated bidders are also presented in parentheses.

	With Credit Rating (1)			Without Credit Rating (2)			Difference (1)-(2)	
Panel A: Bidder Characteristics	**Mean**	**Median**	**N**	**Mean**	**Median**	**N**	**Mean (p-value)**	**Median (p-value)**
Size (in US$ million)	12,920.240	3,092.009	1,747	1,508.230	296.317	5,072	(0.000)	(0.000)
Leverage	0.306	0.273	1,718	0.137	0.072	4,782	(0.000)	(0.000)
Collateral	0.477	0.346	1,436	0.305	0.210	3,930	(0.000)	(0.000)
Book-to-Market	0.427	0.360	1,725	0.504	0.386	4,798	(0.000)	(0.001)
Run-Up	0.018	-0.038	1,707	0.150	-0.054	4.566	(0.000)	(0.840)
% Blockholder Ownership	18.298	13.880	1,563	22.898	18.705	4,206	(0.000)	(0.000)
Cash Flows to Assets	0.062	0.061	1,681	-0.021	0.041	4,728	(0.000)	(0.000)
Number of Analysts	1.259	0.000	1,747	0.374	0.000	5,072	(0.000)	(0.000)
Panel B: Target Characteristics								
Leverage	0.252	0.219	830	0.137	0.084	893	(0.000)	(0.000)
Book-to-Market	0.561	0.471	916	0.889	0.617	1,003	(0.000)	(0.000)
% Blockholder Ownership	21.634	17.400	1,023	20.536	14.920	1,399	(0.206)	(0.128)
Number of Analysts	0.921	0.000	1,023	0.251	0.000	1,399	(0.000)	(0.000)
Profitability	0.084	0.100	904	-0.019	0.024	992	(0.000)	(0.000)
Panel C: Deal Characteristics								
Interest Rate Spread	2.137	2.090	1,747	2.138	2.090	5,072	(0.906)	(0.735)
Relative Size	0.275	0.086	1,747	0.286	0.111	5,072	(0.665)	(0.000)
Fraction of Cash	0.506	0.505	1,747	0.457	0.424	5,072	(0.000)	(0.000)
% Diversifying Deals	36.463	-	1,747	35.962	-	5,072	(0.707)	-
% Hostile Deals	3.034	-	1,747	0.927	-	5,072	(0.000)	-
% Tender Offers	9.788	-	1,747	2.760	-	5,072	(0.000)	-
% Private	41.442	-	1,747	72.417	-	5,072	(0.000)	-
Number of Bidders	1.057	1	1,747	1.018	1	5,072	(0.000)	-

Table 3

(GLM) Logit and Probit Regressions of the Payment Form on Credit Rating Existence and Credit Rating Level

The table presents the results of the (GLM) Logit regression analysis of the fraction of cash financing in specifications (1) and (3), and Probit regression analysis of the choice between more than 50% cash and more than 50% stock in specifications (2) and (4) on credit rating existence, credit rating level and other bidder- and deal-specific characteristics for a sample of US acquisitions over the period 1998-2009. See Appendix A for definitions of the variables. All regressions control for year and industry fixed effects whose coefficients are suppressed. The symbols ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. The z-statistics reported in parentheses are adjusted for heteroskedasticity and bidder clustering. N denotes the number of observations.

	All Sample		Sample With Rating Data	
	GLM Logit (1)	Probit (2)	GLM Logit (3)	Probit (4)
Constant	-1.7355***	-0.9239**	-1.4340	-0.0859
	(-3.44)	(-2.02)	(-1.16)	(-0.09)
Rating Existence	0.1655	0.1208		
	(1.64)	(1.43)		
Rating Level			0.2043***	0.1432***
			(6.25)	(5.42)
Ln (Size)	0.0202	-0.0167	-0.4382***	-0.3427***
	(0.75)	(-0.77)	(-6.63)	(-6.26)
Leverage	0.5274**	0.3541**	0.5422	0.3566
	(2.42)	(2.03)	(1.30)	(1.03)
Collateral	0.1197	0.0399	0.0083	0.1664
	(1.02)	(0.40)	(0.04)	(0.91)
Interest Rate Spread	0.1176	0.0845	0.1957	-0.1740
	(0.52)	(0.41)	(0.33)	(-0.36)
Book-to-Market	0.3656***	0.2651***	-0.1869	-0.0884
	(3.59)	(3.19)	(-1.00)	(-0.56)
Run-Up	-0.2319***	-0.1625***	-0.1888	-0.1021
	(-4.98)	(-4.52)	(-1.44)	(-1.02)
Blockholder Ownership	0.0034*	0.0027*	-0.0014	-0.0033
	(1.96)	(1.88)	(-0.37)	(-1.08)
Cash Flows to Assets	1.9074***	1.3669***	2.4835**	1.1324*
	(7.77)	(7.70)	(2.55)	(1.71)
Number of Analysts	-0.0488***	-0.0315**	-0.0312	-0.0178
	(-2.87)	(-2.55)	(-1.49)	(-1.04)
Relative Size	-0.2846**	-0.1186	-0.4627**	-0.2329**
	(-2.27)	(-1.57)	(-2.54)	(-2.00)
Diversifying Deals	-0.0176	-0.0074	0.1749	0.0705
	(-0.28)	(-0.14)	(1.33)	(0.60)
Hostile Deals	0.9854***	0.6059**	0.8823**	0.4838
	(3.40)	(2.51)	(1.98)	(1.34)
Tender Offers	2.2488***	1.7993***	2.3418***	1.8326***
	(13.51)	(11.38)	(10.08)	(7.92)
Private	1.0379***	0.9066***	1.1374***	0.9943***
	(11.63)	(13.24)	(7.11)	(7.70)
Competition	0.1359	0.2057	0.0608	0.1625
	(0.66)	(1.24)	(0.20)	(0.59)
N	4,256	3,823	1,236	1,120
Pseudo R^2	0.204	0.297	0.303	0.388

Table 4

(GLM) Logit and Probit Regressions of the Payment Form on the Unused Debt Capacity

The table presents the results of the (GLM) Logit regression analysis of the fraction of cash financing (specification (1)), and Probit regression analysis of the choice between more than 50% cash and more than 50% stock (specification (2)) on the unused debt capacity and other bidder- and deal-specific characteristics for a sample of US acquisitions over the period 1998-2009. See Appendix A for definitions of the variables. All regressions control for year and industry fixed effects whose coefficients are suppressed. The symbols ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. The z-statistics reported in parentheses are adjusted for heteroskedasticity and bidder clustering. N denotes the number of observations.

	GLM (Logit)	Probit
	(1)	(2)
Constant	-0.0654	1.7152
	(-0.02)	(0.62)
Unused Debt Capacity	0.8738**	1.1455**
	(1.99)	(2.21)
Unused Debt Capacity x Relative Size	-0.1828	0.1679
	(-0.23)	(0.22)
Ln (Size)	-0.1430	-0.1832*
	(-1.55)	(-1.82)
Leverage	-0.3615	-0.7772
	(-0.50)	(-0.93)
Collateral	0.5783	1.1740***
	(1.38)	(2.81)
Interest Rate Spread	-1.2951	-1.5511
	(-0.96)	(-1.30)
Book-to-Market	-0.2220	-0.0850
	(-0.60)	(-0.26)
Run-Up	-0.3954	-0.4486
	(-1.44)	(-1.48)
Blockholder Ownership	0.0007	-0.0008
	(0.11)	(-0.11)
Cash Flows to Assets	2.4075	-2.2714
	(1.41)	(-1.27)
Number of Analysts	-0.1055***	-0.0665
	(-2.59)	(-1.47)
Relative Size	0.0335	-0.3462
	(0.04)	(-0.38)
Diversifying Deals	0.3052	0.2447
	(1.20)	(0.79)
Hostile Deals	0.5876	0.4145
	(1.46)	(1.06)
Tender Offers	2.1249***	1.8898***
	(5.97)	(5.10)
Competition	0.1094	0.0772
	(0.28)	(0.19)
N	257	218
Pseudo R^2	0.287	0.430

Table 5

Regressions of the Payment Form on the Investment Grade

The table presents the results of the (GLM) Logit (specification (1)), and Probit (specification (2)) regression analyses of the choice of the method of payment on investment grade and other bidder- and deal-specific characteristics for a sample of US acquisitions over the period 1998-2009. See Appendix A for definitions of the variables. All regressions control for year and industry fixed effects whose coefficients are suppressed. The symbols ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. The z-statistics reported in parentheses are adjusted for heteroskedasticity and bidder clustering. N denotes the number of observations.

	GLM (Logit)	Probit
	(1)	(2)
Constant	-0.3386	0.8201
	(-0.28)	(0.81)
Investment Grade	0.5600***	0.4906***
	(3.05)	(3.22)
Ln (Size)	-0.2424***	-0.2163***
	(-4.22)	(-4.66)
Leverage	0.2576	0.1832
	(0.63)	(0.54)
Collateral	0.1458	0.2590
	(0.68)	(1.40)
Interest Rate Spread	0.1894	-0.2401
	(0.33)	(-0.50)
Book-to-Market	-0.0887	-0.0273
	(-0.49)	(-0.18)
Run-Up	-0.2661**	-0.1540
	(-2.09)	(-1.60)
Blockholder Ownership	-0.0027	-0.0045
	(-0.68)	(-1.41)
Cash Flows to Assets	2.9392***	1.4702**
	(2.97)	(2.20)
Number of Analysts	-0.0382*	-0.0249
	(-1.86)	(-1.51)
Relative Size	-0.5094***	-0.2595**
	(-2.63)	(-2.18)
Diversifying Deals	0.1574	0.0483
	(1.20)	(0.42)
Hostile Deals	0.8656*	0.4346
	(1.88)	(1.18)
Tender Offers	2.2868***	1.7956***
	(9.70)	(7.73)
Private	1.0737***	0.9564***
	(6.59)	(7.39)
Competition	0.1126	0.2368
	(0.37)	(0.87)
N	1,236	1,120
Pseudo R^2	0.288	0.374

Table 6

Endogeneity Control for Credit Rating Existence

The table presents the results of the control function regression approach to test for potential endogeneity of credit rating existence for a sample of US acquisitions over the period 1998-2009. Specification (1) is the reduced regression. Specification (2) is the structural regression of the bivariate probit method. Specification (3) is the structural regression of the control function method. See Appendix A for definitions of the variables. All regressions control for year fixed effects whose coefficients are suppressed. The symbols ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. The z-statistics reported in parentheses are adjusted for heteroskedasticity and bidder clustering. N denotes the number of observations. The first lower part of the table shows the *F*-test from the linear first-stage regression testing the joint significance of the excluded instruments and the Stock and Yogo (2002) (LIML) critical values of the 10% expected size distortion on a 5% nominal Wald test. The second lower part of the table shows the Wald test of endogeneity.

	Reduced	Structural	Structural
	(1)	(2)	(3)
Constant	-6.1695***	-1.1565***	-1.0220**
	(-12.60)	(-2.58)	(-2.38)
Rating Existence		0.0338	0.2794
		(0.11)	(0.99)
Residual Rating			-0.0442
			(-0.35)
Industry Fraction	1.4803***		
	(4.54)		
Industry Profitability	1.4871***		
	(3.20)		
Industry Risk	-0.0008		
	(-0.52)		
Regulated Industry	0.0624		
	(0.39)		
Ln (Size)	0.6501***	-0.0101	-0.0386
	(17.68)	(-0.24)	(-1.08)
Leverage	3.8881***	0.6251**	0.4322*
	(14.27)	(2.11)	(1.74)
Collateral	0.0738	0.1536*	0.1346
	(0.68)	(1.78)	(1.58)
Interest Rate Spread	-0.1607	-0.0168	-0.0057
	(-0.72)	(-0.08)	(-0.03)
Book-to-Market	0.5765***	0.3103***	0.2856***
	(4.53)	(3.31)	(3.11)
Run-Up	-0.2994***	-0.1640***	-0.1536***
	(-6.72)	(-4.07)	(-3.89)
Blockholder Ownership	-0.0009	0.0027*	0.0028*
	(-0.44)	(1.82)	(1.95)
Cash Flows to Assets	1.0399**	1.4966***	1.4952***
	(2.41)	(8.16)	(8.10)
Number of Analysts	-0.0034	-0.0365***	-0.0370***
	(-0.23)	(-2.99)	(-2.99)
Relative Size	-0.0637	-0.0837	-0.0893
	(-1.10)	(-1.25)	(-1.35)
Diversifying Deals	0.2022***	0.1033*	0.0954*
	(2.97)	(1.90)	(1.75)
Hostile Deals	-0.3840*	0.5669**	0.5788**
	(-1.74)	(2.20)	(2.24)
Tender Offers	0.3486***	1.8202***	1.8077***
	(2.94)	(11.61)	(11.49)
Private	-0.2456***	0.8777***	0.8938***
	(-3.13)	(11.82)	(12.55)
Competition	0.0559	0.2455	0.2472
	(0.32)	(1.47)	(1.48)
N	4,079	3,667	3,667
Pseudo R^2	0.526	0.389	0.272
***F*-test**	10.58		
LIML size of nominal 5% Wald	5.44		
Wald Test		0.24	
(P-value)		(0.627)	

Table 7

Endogeneity Control for Credit Rating Level

The table presents the results of the control function regression approach to test for potential endogeneity of credit rating level for a sample of US acquisitions over the period 1998-2009. Specification (1) is the reduced regression. Specification (2) is the structural regression for the IV Probit method. Specification (3) is the structural regression for the 2SCML method. See Appendix A for definitions of the variables. All regressions control for year fixed effects whose coefficients are suppressed. The symbols ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. The t- and z-statistics reported in parentheses are adjusted for heteroskedasticity and bidder clustering. N denotes the number of observations. The first lower part of the table shows the *F*-test from the linear first-stage regression testing the joint significance of the excluded instruments and the Stock and Yogo (2002) (LIML) critical values of the 10% expected size distortion on a 5% nominal Wald test. The second lower part of the table shows the Hausman (1978) and Wald test of endogeneity.

	Reduced	Structural	Structural
	(1)	(2)	(3)
Constant	0.9858	0.1868	-0.0033
	(0.81)	(0.18)	(-0.00)
Rating Level		0.1577*	0.1596**
		(1.85)	(1.98)
Industry Level	0.1456***		
	(4.06)		
Industry Profitability	0.5402		
	(0.57)		
Industry Risk	-0.0084**		
	(-2.12)		
Regulated Industry	1.2047***		
	(3.70)		
Ln (Size)	1.3050***	-0.3692***	-0.3785***
	(18.57)	(-3.06)	(-3.29)
Leverage	-2.5610***	0.1961	0.1859
	(-4.94)	(0.51)	(0.50)
Collateral	0.8516***	0.0241	0.0315
	(3.68)	(0.17)	(0.21)
Interest Rate Spread	0.1252	-0.2380	-0.1394
	(0.26)	(-0.48)	(-0.33)
Book-to-Market	0.7025***	-0.1388	-0.1205
	(2.68)	(-0.84)	(-0.75)
Run-Up	-0.7977***	-0.0995	-0.1074
	(-5.76)	(-0.83)	(-0.91)
Blockholder Ownership	-0.0068	-0.0029	-0.0027
	(-1.63)	(-0.88)	(-0.84)
Cash Flows to Assets	4.7281***	1.4327**	1.3621*
	(3.54)	(2.00)	(1.95)
Number of Analysts	-0.0577**	-0.0272*	-0.0282
	(-2.00)	(-1.65)	(-1.55)
Relative Size	-0.2293	-0.2300*	-0.2302**
	(-1.44)	(-1.81)	(-2.07)
Diversifying Deals	0.3692**	0.0935	0.1039
	(2.46)	(0.81)	(0.97)
Hostile Deals	-0.3618	0.5754	0.5858**
	(-1.05)	(1.37)	(2.02)
Tender Offers	0.5538**	1.8163***	1.8936***
	(2.42)	(7.67)	(9.55)
Private	-0.2699	0.9326***	0.9881***
	(-1.54)	(7.44)	(7.83)
Competition	0.1699	0.2815	0.2428
	(0.59)	(0.99)	(1.03)
N	1,161	1,053	1,053
Pseudo (Adjusted) R^2	(0.628)	0.351	0.385
***F*-test**	13.44		
LIML size of nominal 5% Wald	5.44		
Hausman (Wald) Test		0.00	(0.00)
(P-value)		(0.974)	(0.974)

Table 8

Analysis of the Impact of Unobserved Confounding Variables

The table shows an assessment of the impact of unobserved confounding variables based on Frank (2000). For the main control variable (rating level) an impact statistic is calculated (ITCV) indicating the minimum impact of a confounding variable that would be needed to render the coefficient statistically insignificant. The ITCV is defined as the product of the correlation between the x-variable (rating level) and the confounding variable and the correlation between the y-variable (cash-dominated) and the confounding variable. To assess the likelihood that such a variable exists, column (2) shows the impact of each independent variable on the coefficient of the rating level. The impact is defined as the product of the partial correlation between the x-variable (rating level) and the control variable and the correlation between the y-variable (cash-dominated) and the control variable (partialling out the effect of the other control variables). Column (3) shows a more conservative measure of impact, which is the product of the simple correlation between the x-variable and the control variable and the simple correlation between the y-variable and the control variable.

	ITCV	Impact	Impact $_{Raw}$
	(1)	(2)	(3)
Rating Level	-0.072		
Ln (Size)		-0.067	-0.088
Leverage		0.002	0.017
Collateral		0.000	-0.001
Interest Rate Spread		-0.020	0.002
Book-to-Market		-0.004	-0.005
Run-Up		0.011	0.021
Blockholder Ownership		-0.011	-0.037
Cash Flows to Assets		0.014	0.038
Number of Analysts		0.003	-0.010
Relative Size		0.002	0.016
Diversifying Deals		0.002	0.006
Hostile Deals		-0.001	0.001
Tender Offers		0.018	0.042
Private		-0.026	-0.091
Competition		0.000	0.000

Table 9

Regressions of the Payment Form on Credit Rating Existence and Credit Rating Level with Target Firm Control Variables

The table presents the results of the (GLM) Logit in specifications (1) and (3) and Probit regression analysis in specifications (2) and (4) of the choice of method of payment on credit rating existence, credit rating level and other bidder-, target- and deal-specific characteristics for a sample of US public acquisitions over the period 1998-2009. See Appendix A for definitions of the variables. All regressions control for year and industry fixed effects whose coefficients are suppressed. The symbols ***, ** and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. The z-statistics reported in parentheses are adjusted for heteroskedasticity and bidder clustering. N denotes the number of observations.

	All Sample		Sample with Rating Data	
	GLM Logit (1)	Probit (2)	GLM Logit (3)	Probit (4)
Constant	-2.2249*	-0.9039	-1.2013	-0.0511
	(-1.73)	(-0.91)	(-0.54)	(-0.03)
Rating Existence	0.2091	0.0374		
	(1.19)	(0.26)		
Rating Level			0.1547***	0.0976***
			(3.62)	(2.94)
Ln (Size)	0.0735	0.0650*	-0.2289**	-0.1307
	(1.35)	(1.69)	(-2.27)	(-1.62)
Leverage	-0.6684	-0.5772*	-0.8263	-0.7679
	(-1.43)	(-1.70)	(-1.22)	(-1.46)
Collateral	-0.0902	0.0119	-0.1640	0.1990
	(-0.38)	(0.06)	(-0.50)	(0.73)
Interest Rate Spread	0.0034	-0.3520	-0.2646	-0.7359
	(0.01)	(-0.73)	(-0.25)	(-0.97)
Book-to-Market	0.2227	0.1695	-0.1610	-0.0642
	(1.17)	(1.40)	(-0.60)	(-0.28)
Run-Up	-0.3628*	-0.1597	-0.2270	-0.1484
	(-1.79)	(-1.47)	(-0.94)	(-0.83)
Blockholder Ownership	-0.0010	-0.0011	-0.0049	-0.0041
	(-0.24)	(-0.35)	(-0.86)	(-0.89)
Cash Flows to Assets	2.1351***	1.3430***	2.4240**	1.1559
	(4.20)	(3.66)	(2.01)	(1.38)
Number of Analysts	-0.0430*	-0.0322*	-0.0376	-0.0297
	(-1.88)	(-1.82)	(-1.20)	(-1.17)
TLeverage	-0.8106**	-0.0374	-0.8097**	-0.1345
	(-2.52)	(-0.14)	(-2.11)	(-0.40)
TBook-to-Market	0.0300	0.0382	0.0472	-0.0603
	(0.68)	(1.18)	(0.31)	(-0.38)
TBlockholder Ownership	0.0037	0.0028	0.0056	0.0045
	(1.01)	(1.04)	(1.02)	(1.02)
TNumber of Analysts	-0.1110***	-0.0915***	-0.1129**	-0.1290***
	(-2.77)	(-2.79)	(-2.48)	(-3.08)
TProfitability	-0.0257	-0.0168	-0.9809**	-0.9361**
	(-0.09)	(-0.08)	(-2.06)	(-2.28)
Relative Size	-0.0748	-0.0186	-0.2470	-0.0813
	(-0.31)	(-0.19)	(-1.22)	(-0.52)
Diversifying Deals	-0.0088	-0.0815	-0.2179	-0.2289
	(-0.06)	(-0.75)	(-1.16)	(-1.45)
Hostile Deals	0.9697***	0.5698**	0.9000*	0.4980
	(2.87)	(2.19)	(1.83)	(1.37)
Tender Offers	2.3645***	1.7426***	2.1819***	1.6112***
	(11.43)	(10.19)	(7.40)	(6.56)
Competition	0.1272	0.2514	0.2194	0.3235
	(0.52)	(1.37)	(0.66)	(1.20)
N	1,044	981	558	511
Pseudo R^2	0.290	0.336	0.317	0.365